MANUAL PART NUMBER: 400-0047-004
PRODUCT REVISION: 2

MAX SERIES

MATRIX SWITCHERS

USER'S GUIDE

ALTINEX
SIGNAL MANAGEMENT SOLUTIONS
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INTRODUCTION

Altinex appreciates your purchase of the **MAX** Series Matrix Switcher. We are sure you will find it a reliable and useful product.

Superior performance for the right price backed by solid technical and customer support is what we have to offer.

The product you are holding in your hands is designed using state-of-the-art technology and is superior to anything available on the market. You will find this and our other products reliable, long lasting, and simple to operate.

We are committed to providing our customers with solutions to the most demanding audio-visual installations at very competitive pricing.

We appreciate your selection of our products and are confident that you will join the ranks of our many satisfied customers throughout the world.

This manual covers:

MXAxxyy – VmAn
MXVxxyy – VmAn
MXRxxyy – VmAn

where

MXA	Audio (Mono / Stereo) switcher
MXV	Video (Composite, S-Video & Component) switcher, with 100 MHz bandwidth
MXR	Video (High resolution RGsB, RGBS, RGBHV) switcher, with 400 MHz bandwidth
xx	number of inputs per each of **MAX** switcher module, xx-04/08
yy	number of outputs per each channel **MAX** switcher module, yy-02/04
m	number of channels of video signals in the switcher, m = 1 to 5
n	number of channel of audio signals in the switcher, n = 1/2

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PRECAUTIONS/SAFETY WARNINGS 1

Please read this manual carefully before using your **MAX** Series Matrix Switcher. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MAX** Series Switcher and to prevent fire and shock hazard. Please read them carefully and heed all warnings.

1.1 GENERAL

- Unauthorized personnel shall not open the unit since there are high-voltage components inside.
- Qualified Altinex service personnel, or their authorized representatives must perform all service.

1.2 INSTALLATION

- For best results, place the **MAX** Series Switcher on a flat, level surface in a dry area, away from dust and moisture. To prevent fire or shock, do not expose this unit to rain or moisture. Do not place the **MAX** Switcher in direct sunlight, near heaters or heat radiating appliances, or near any liquid. Exposure to direct sunlight, smoke, or steam can harm internal components.
- Handle your **MAX** Switcher carefully. Dropping or jarring can damage the internal components. Do not place heavy objects on top of the **MAX** Switcher.
- Do not place the **MAX** Switcher in direct sunlight, near heaters or heat radiating appliances, or near any liquid. Exposure to direct sunlight, smoke or steam can harm internal components. Do not pull power cord or any signal cables that are attached to the **MAX**. If the **MAX** is not to be used for an extended period of time, disconnect the power cord from the power outlet.

1.3 RACK-MOUNT INSTALLATION

- Use only Altinex supplied rack-mount ears for mounting the **MAX** Switcher into a rack.
- The maximum operating ambient temperature is 45 degrees Centigrade.
- When installing the **MAX** Series Switcher into a rack, distribute individual units evenly, otherwise hazardous conditions may be created by an uneven weight distribution. Allow 1-U of rack space for every four **MAX** Switcher modules for air circulation. This will reduce heat build up and will prolong the life of the **MAX** Switcher.
- Connect the **MAX** Series Switcher to a properly rated power outlet.
- Reliable Earthling of the **MAX** Series Switcher should be maintained by connecting using the provided 3-prong power cord only. Furthermore, make sure that the rack is properly grounded.

1.4 CLEANING

- Unplug the **MAX** Series Switcher's power cord before cleaning.
- Clean surfaces with a dry cloth. Never use strong detergents or solvents such as, alcohol or thinner. Do not use a wet cloth or water to clean the unit.

1.5 FCC NOTICE

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Any changes or modifications to the unit not expressly approved by Altinex, Inc. could void the user's authority to operate the equipment.

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ABOUT YOUR MAX SERIES MATRIX SWITCHER 2

The Altinex **MAX** Series Matrix Switchers are designed to route multiple computers or video sources to multiple display devices in a wide range of audio/visual installations.

The **MAX** Series line of matrix switchers is available in the following sizes: 4x2, 4x4, 8x2, 8x4. The bandwidth of 100 MHz is available for composite video, s-video & components switching and 400 MHz for high-resolution video RGB switching.

The versatility of the **MAX** Series Switcher allows Altinex to deliver the perfect matrix switcher to fit your audio visual needs.

The **MAX** Series Matrix Switcher is designed for ease of use and flexibility of operation, allowing a non-technical person to perform intuitively all switching functions using the front panel control. It offers extensive and powerful capabilities to the advanced user through RS-232 control.

Some of the unique features of the **MAX** Series Switcher include high bandwidth, Projector control capabilities, Sync Delay Switching (allows the "glitch" to take place off the display screen, dual RS-232 port and easy to use Front Panel control.

With all these exceptional features, the **MAX** Series is the perfect solution for your audio/visual equipment needs.

TECHNICAL SPECIFICATION 3

FEATURES/ DESCRIPTION	MXR	MXV	MXA
GENERAL			
Inputs			
BNC (F) (Video)	x	x	
5-position Terminal Block (Audio)	x	x	x
Coupling	DC	DC	DC
Outputs			
BNC (F) (Video)	x	x	
5-position Terminal Block (Audio)	x	x	x
Coupling	DC	DC	DC
MECHANICAL			
Material	0.47' thick Aluminum		
Height (inches)	5.25in (133mm)		
Width (inches)	17.00in (432mm)		
Length (inches)	9.50in (241mm)		
Weight (pounds)	11.0lbs (5.0kg)	8.0lbs (3.6kg)	7.0lbs (3.2kg)
Ship Weight (pounds)	16.0lbs (7.3kg)	13.0lbs (5.9kg)	12.0lbs (5.4kg)
ELECTRICAL			
Video Signals (Inputs & Outputs)			
RGBHV	x	—	—
RGBS	x	—	—
RGsB	x	—	—
Component Video	x	x	—
C-Video	x	x	—
S-Video	x	x	—
Audio	x	x	x
Frequency Compatibility			
Bandwidth (MHz)	400MHz	100MHz	100 kHz
Rise Time (ns)	1.2ns	3.1ns	—
Fall Time (ns)	1.2ns	3.1ns	—
Gain Default Setting	1.05	1.05	6dB
Output impedance	75ohms	75ohms	10ohms
Input Video Level	+/-1 V max	+/-1 V max	Line level
Input Sync Level	TTL or Analog	—	—
Internal Power Supply	90- 260V		
Power Consumption	10-15W 30W max		
Adjustments/ Controls			
Front Panel	x		
RS-232 (2 ports)	x		
Supply through RS-232 port1 (+5V)	100 mA max		
Supply through RS-232 port2 (+12V)	100 mA max		
Included			
Manual	x		
Rack Mount Brackets **DA1296RM**	x		

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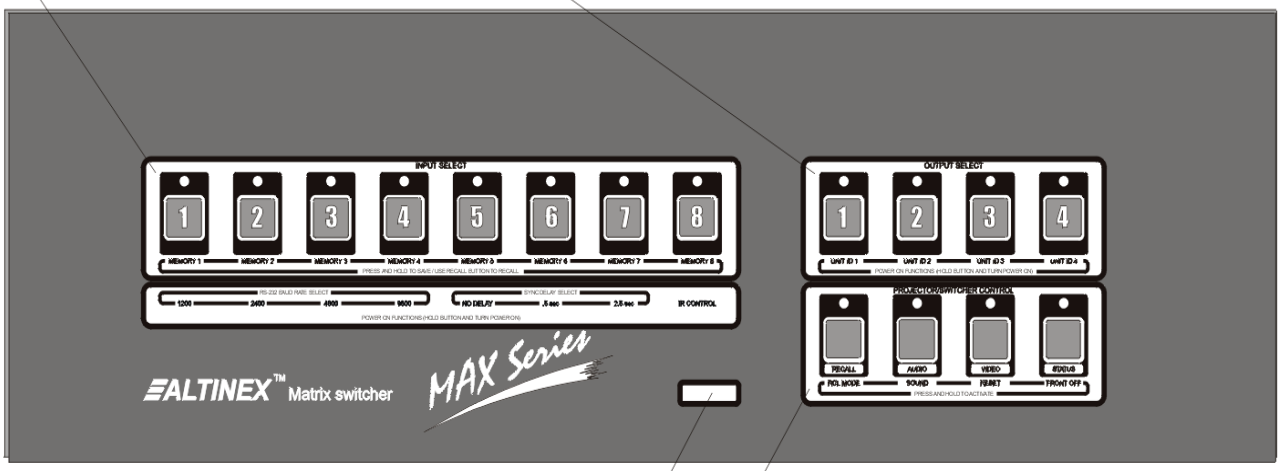
Power Cord	x
5-position Terminal Connector	x
4-position Terminal Connector	x

DIAGRAM OF FRONT/BACK PANEL 4

FRONT PANEL OF MAX SWITCHER

NORMAL MODE (PRESS & RELEASE) : BUTTONS 1 THROUGH 8 : INPUT SELECTION
NORMAL MODE (PRESS & HOLD) : BUTTONS 1 THROUGH 8 : SAVE CURRENT CONNECTIONS INTO MEMORY
RECALL MODE : BUTTONS 1 THROUGH 8 : RECALL FROM MEMORY LOCATION NUMBER
POWER-ON MODE : BUTTONS 1 THROUGH 4 : SET BAUD RATE
: BUTTONS 5 THROUGH 7 : SET SYNC DELAY
: BUTTON 8 : ENABLE IR-MODE FOR OPTIONAL RC5251IR

NORMAL MODE : BUTTONS 1 THROUGH 4 : OUTPUT SELECTION
POWER-ON MODE : BUTTONS 1 THROUGH 4 : UNIT ID SETUP



MODEL NUMBER

NORMAL MODE (PRESS & RELEASE) : BUTTON 1 : ENABLE/DISABLE RECALL MODE
: BUTTON 2 : ENABLE/DISABLE AUDIO CHANNELS
: BUTTON 3 : ENABLE/DISABLE VIDEO CHANNELS
: BUTTON 4 : GIVES STATUS OF SYSTEM SETTINGS LIKE BAUD RATE, SYNC DELAY & IR- MODE WHEN ENABLED
NORMAL MODE (PRESS & HOLD) : BUTTON 1 : ENABLE/DISABLE RECALL MODE
: BUTTON 2 : ENABLE/DISABLE CLICK SOUND WHEN EACH BUTTON IS PRESSED
: BUTTON 3 : RESET THE UNIT (BAUD RATE TO 2400 BPS, DISCONNECT CURRENT CONNECTIONS, RECALL MEMORY LOCATION # 1)
: BUTTON 4 : LOCK/UNLOCK FRONT PANEL

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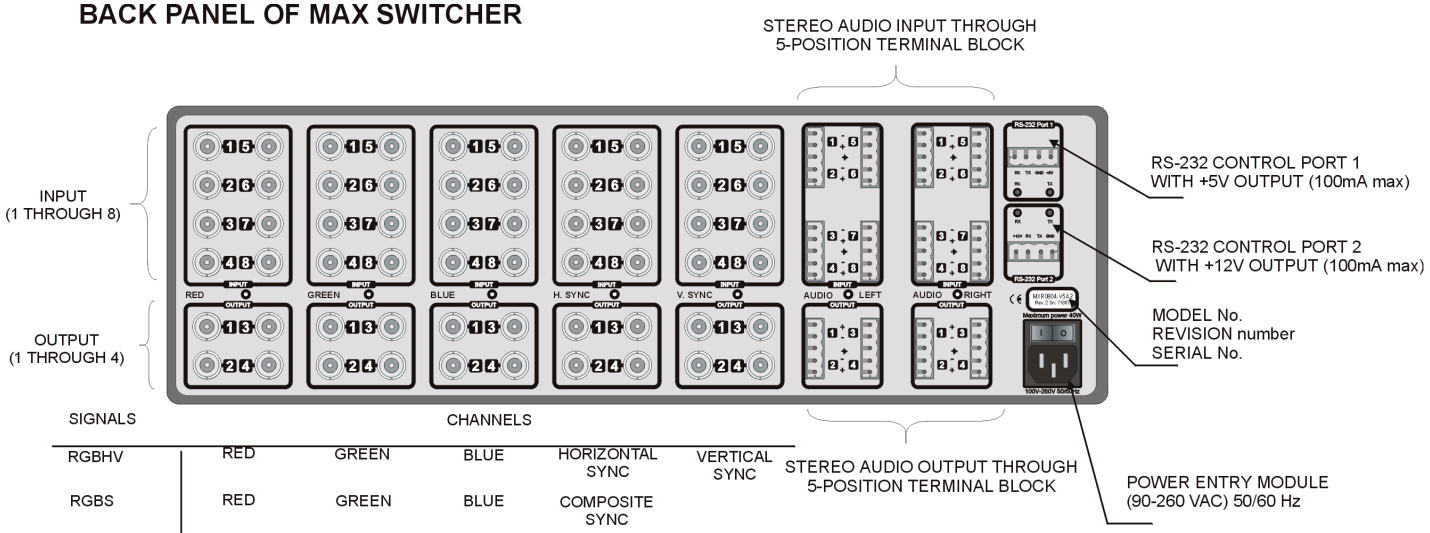
BACK PANEL OF MAX SWITCHER



SIGNALS	CHANNELS					
RGBHV	RED	GREEN	BLUE	HORIZONTAL SYNC	VERTICAL SYNC	
RGBS	RED	GREEN	BLUE	COMPOSITE SYNC		
COMPONENT	RED	GREEN	BLUE			
S-VIDEO	LUMA	CHROMA				
COMPOSITE	VIDEO					

4.1 BACK PANEL CONTROL

The **MAX** Series Matrix Switcher offers great flexibility in configuring the switcher. Each portion of the signal can be controlled independently or in any desired grouping. This allows use of the switcher with a variety of signal formats, and allows multiple independent switchers in one enclosure. For example, **MXR0804-V3A0** can be used as three 8x4 Composite Video Switchers or as one 8x4 Composite Video with one 8x4 S-Video Switcher.

4.2 H & V SYNC, COMPOSITE SYNC

The horizontal and vertical sync ports are designed to handle TTL and Analog Sync signals. The two sync ports will switch simultaneously when controlled separately from video ports. The independent control of video and sync portions of the signal allows use of the sync delay switching function. The delay in switching between video and sync insures noise-free (glitch-free) switching between any channels.

4.3 AUDIO PORTS (L&R)

The **MAX** Series Matrix Switcher is available with either mono or stereo balanced audio inputs and outputs for clear quality sound. The terminal block connectors used for Audio simplify the connection of the Audio signal.

4.4 RS-232 PORTS 1&2

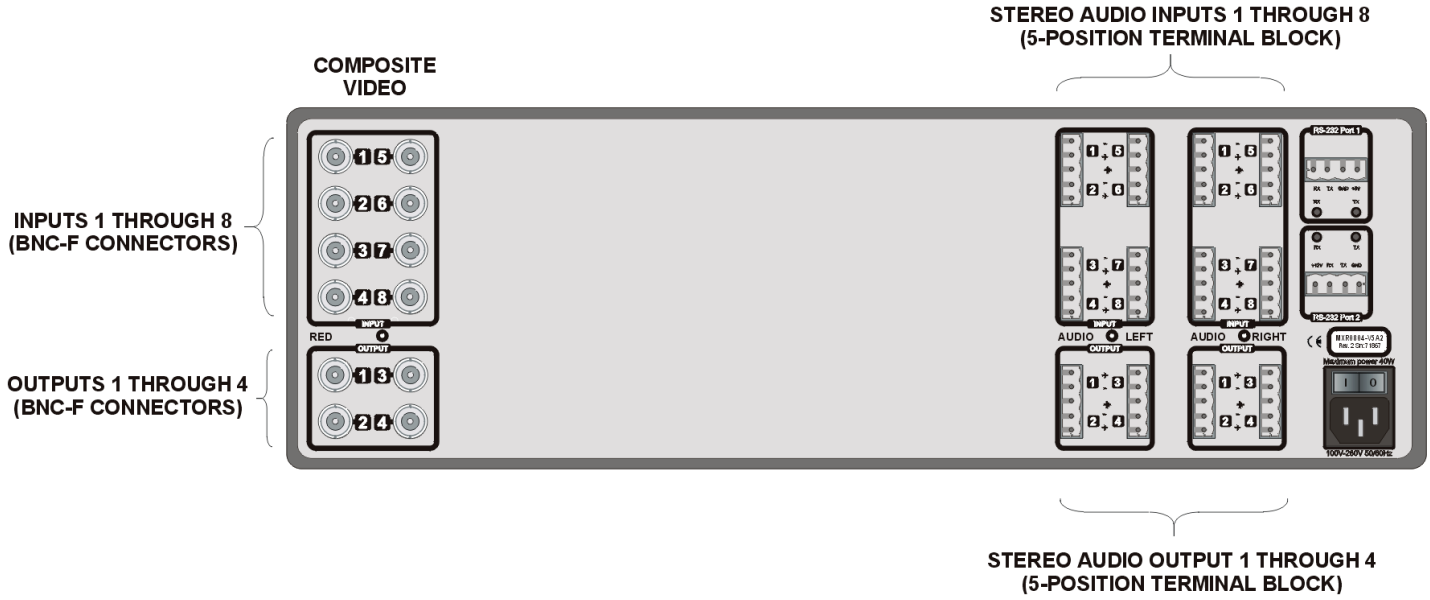
The **MAX** Series Matrix Switcher is equipped with two RS-232 ports. This allows control of the switcher from two different locations. The RS-232 ports can be used to control other devices, such as projectors, by the switcher. The front panel switches can be programmed to activate RS-232 commands to be sent to the projector.

The computer video signal can be RGsB, RGBS, or RGBHV format. The broadcast video signal can be C-Video, S-Video, or Component Video in NTSC, PAL or SECAM standard. The audio signal can be Mono or Stereo.

Depending on the signal and size configuration of the **MAX** Switcher, the back panel of the switchers will be different. Here are examples of an 8x4 **MAX** switcher for different number of signals.

APPLICATION DIAGRAM 5

MXV0804-V1A2 [COMPOSITE VIDEO + STEREO AUDIO, 8x4 SWITCHER (100MHz)]



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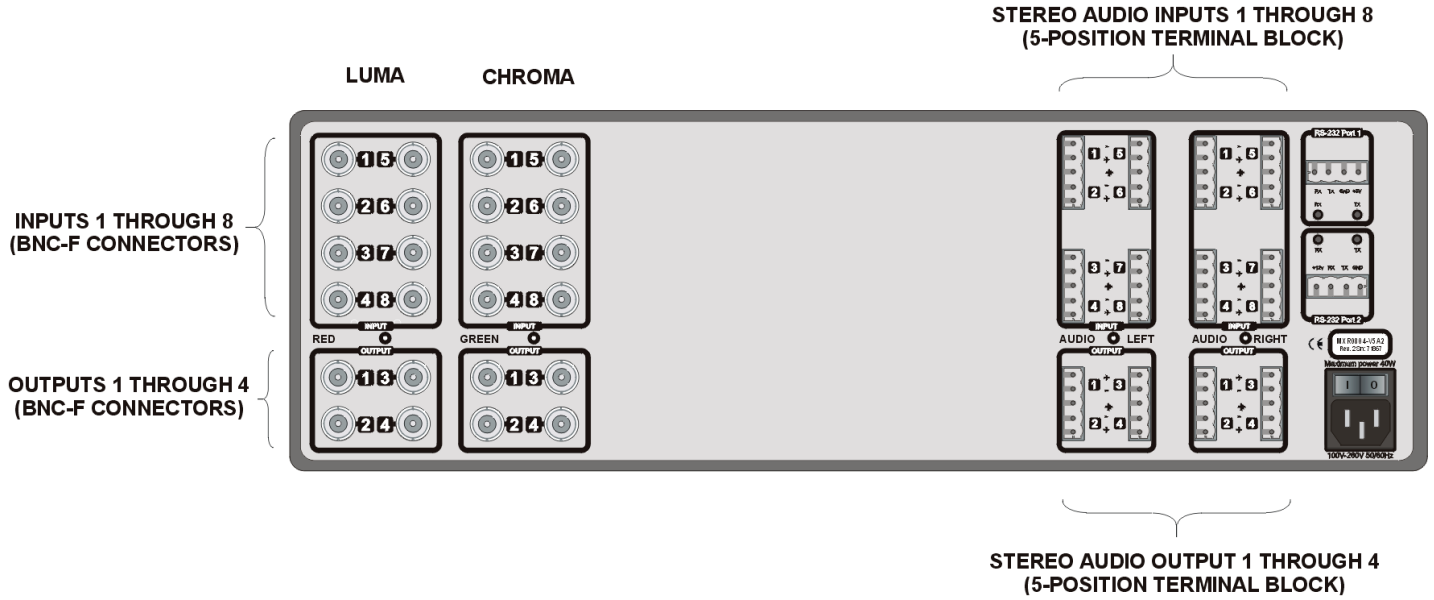
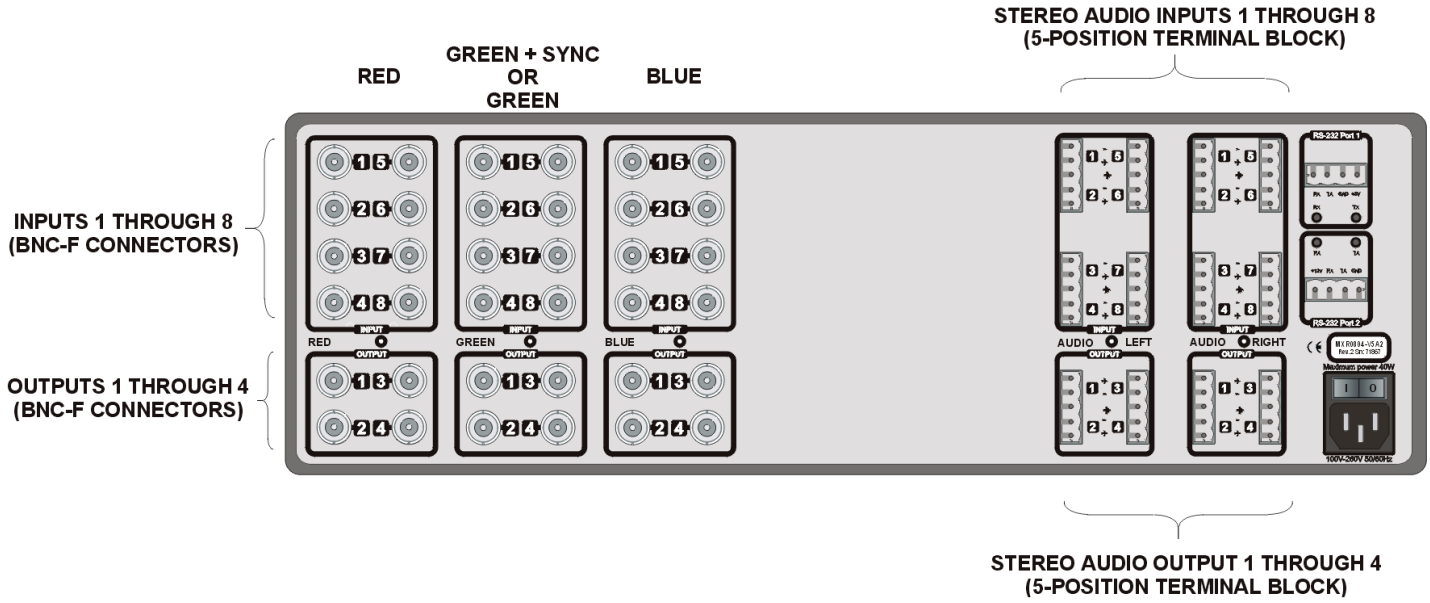
MXV0804-V2A2 [S-VIDEO +STEREO AUDIO, 8x4 SWITCHER (100MHz)]



MXR0804-V3A2 [RGB / RGsB + STEREO AUDIO, 8x4 SWITCHER (400MHz)]



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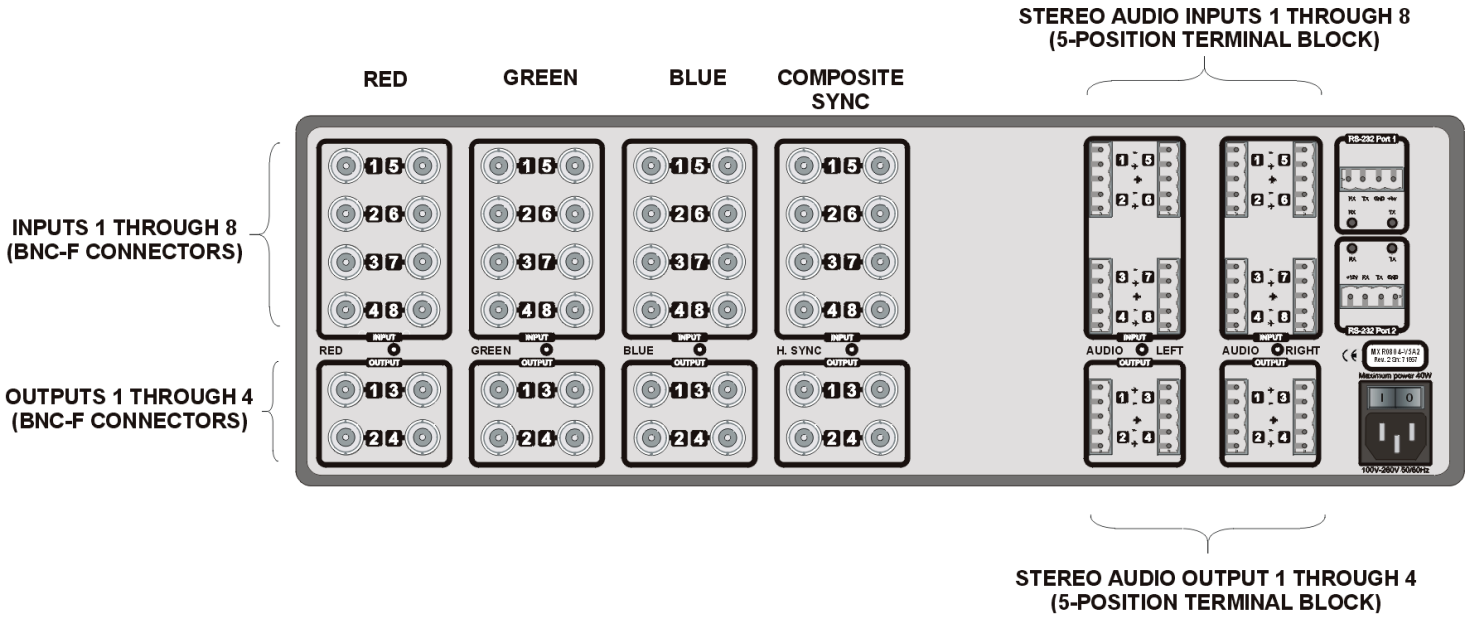
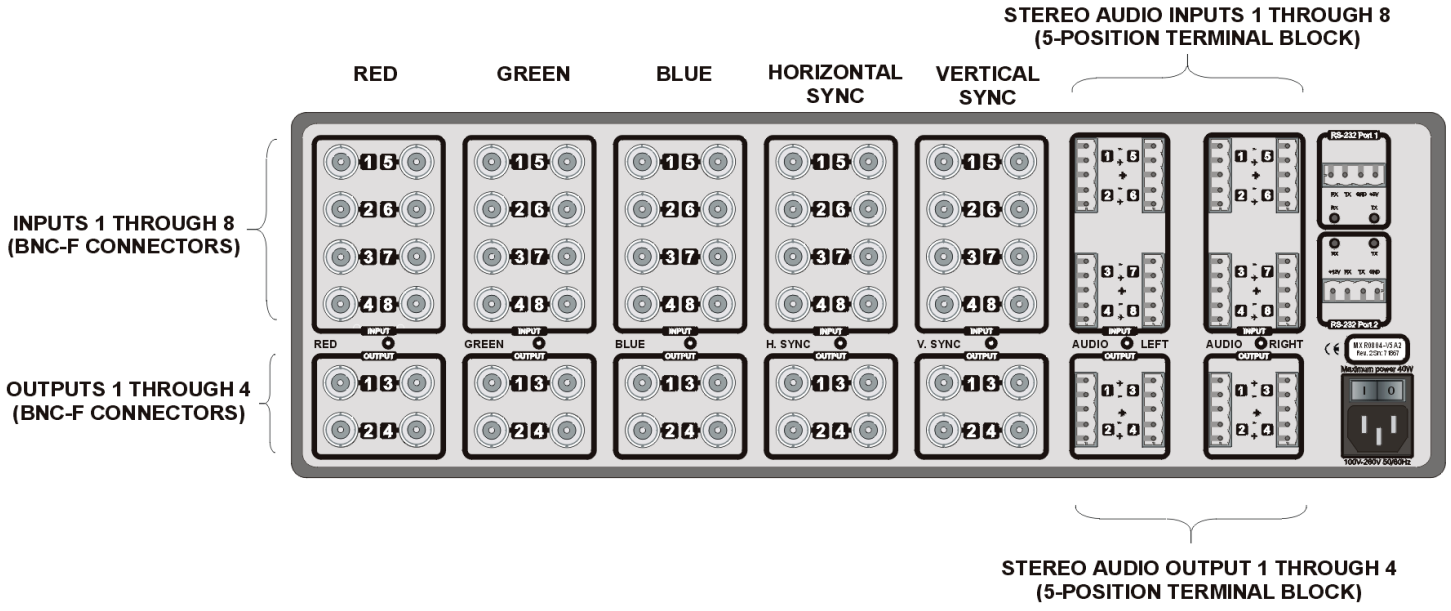
MXR0804-V4A2 [RGBS + STEREO AUDIO, 8x4 SWITCHER (400MHz)]



MXR0804-V5A2 [RGBHV + STEREO AUDIO, 8x4 SWITCHER (400MHz)]



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INSTALLING YOUR SWITCHER 6

Step 1. Connect the power entry connector of the **MAX** Switcher to the power outlet with the provided power cord. The power supply is universal and will work throughout the world with voltages between 90V-260V.

Step 2. Connect the cables from the video sources (computers, VCR, others) to available inputs 1 through 8 and connect the display device (i.e. monitor or projector) to available outputs 1 through 4.

CAUTION:
All video inputs to MAX Series are DC coupled for best performance. Even though the video inputs are fully isolated, verify with an electrician that all of the grounding is proper and that GROUND LOOP problems are minimized. Severe Ground loop type conditions can damage equipment.
MAXIMUM VIDEO INPUT: +/-1.2 VOLTS **MAXIMUM AUDIO/SYNC INPUT: +/- 5 VOLTS**

Step 3. If a control system is used to control the unit, connect the RS-232 port of the **MAX** Switcher to the control system's RS-232 port as show in Table 1.

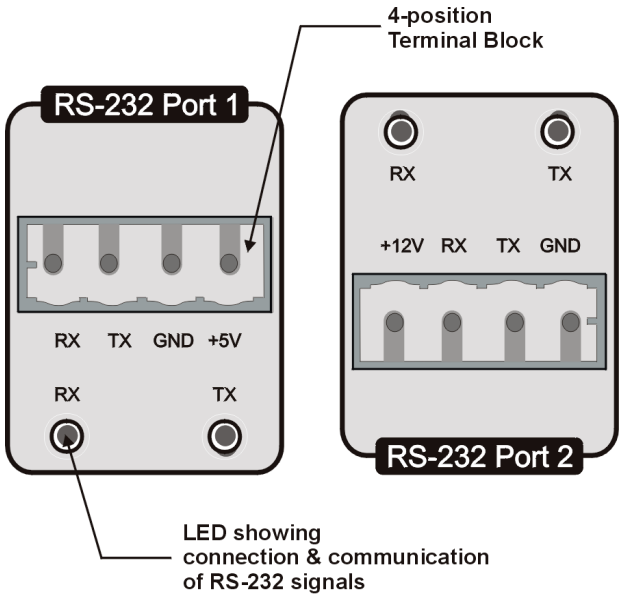
RS-232 port of MAX switcher	Computer or Control System
Tx (Transmit)	Receive
Rx (Receive)	Transmit
GND (Ground)	Ground
+12V / +5V	N/C

Table 1. **MAX** Switcher RS-232 port control

Make sure that the transmit pin of the control system is connected to the receive pin of the switcher.

Test the units outside of the rack prior to installation to insure that you have established communication.

If the connection is correct, both Rx & Tx LED's (located below contact pins) on the selected RS-232 port will turn green.



If the connection is incorrect, LED's will turn red.

Step 4. Turn on the power switch. The unit is now operational. You should observe the power LED on the back panel "ON" and the VIDEO or AUDIO switch LED light on the front panel "ON". You are ready to either program your switcher or perform switching from the front panel.

CONGRATULATIONS! YOU ARE DONE.

If you experience any problems, please call 1-800-258-4623 or 1 (714) 990-2300 for international calls.

OPERATION 7

7.1 FRONT PANEL CONTROL

The **MAX** Series Matrix Switcher is designed to perform a variety of functions using the front panel control. All front panel switches have three modes of operation: PRESS and RELEASE, PRESS and HOLD and Power ON.

In PRESS and RELEASE mode the switcher performs primary functions. Simply press and release the button right after a beep. An LED usually verifies the action.

In PRESS and HOLD mode the switcher performs secondary functions. Press and hold the button until all LED's flash and the unit beeps a second time.

In POWER-ON mode the switcher changes settings that are stored in the switcher's memory. These modified settings become the default settings next time the unit is powered.

The LED lights located next to any switch on the front panel of the switcher have four basic states of operation: OFF, ON, SLOW FLASH, and FAST FLASH. Each state represents certain actions that can be taken by the operator.

When the LED is OFF or ON the switcher is in a Normal Mode and no action by the operator is required.

When the LED's SLOW FLASH or FAST FLASH the switcher is in a Set-Up Mode.

The SLOW FLASH indicates that a particular set up action can be either completed or canceled.

If the lights are in a FAST FLASH state, it is an indication of what is actually connected and that an action is required to perform switching.

Whenever switching is to be initiated, the switcher must be in a Normal Mode. The Input and Output LED's should be either ON or OFF.

The number of input switches will be according to your matrix configuration. The remaining switches will only be usable for the secondary functions. For example, in a 4x4 switcher all 8 input switches might be present, but only 4 are active for Input Selection, while all 8 can be used for secondary functions.

CONNECT INPUT TO OUTPUT

To connect any input to any output press sequentially [INPUT (n)] +[OUTPUT (m)]. This function can also be performed by pressing [OUTPUT (m)]+[INPUT (n)]. When you press INPUT(n) the LED next to that input switcher will SLOW FLASH indicating that the operation is not completed and a particular action is required. Pressing the desired OUTPUT(m) switch will complete the operation. When the connection is made both the INPUT and OUTPUT LED's will be ON.

For example, to display the signal from a source connected to input 3 on the monitors and connected to outputs 1 and 3 press:

INPUT3 + OUTPUT1 & INPUT3 + OUTPUT3 or OUTPUT1 + INPUT3 & OUTPUT3 + INPUT3

SAVING SWITCHER CONFIGURATION IN MEMORY

Once it is defined which outputs are connected to which inputs, the switcher configuration can be stored in one of the eight available memories.

To store the switcher configuration, press INPUT 1 through 8, and hold the button until all LED's flash and the unit beeps. By doing this a preset or salvo of input to output connections is stored into the memory location for a later recall.

BAUD RATE SETTING

The BAUD RATE setting is important for the remote control function of the switcher, through RS-232 ports.

The factory default setting is 2400 baud, 8 bits, 1 stop, and no parity.

To change to 1200 baud rate, press and hold the Input1 key and turn the power ON. Then wait for a long and short beep.

To change to 2400 baud rate, press and hold the Input2 key and turn the power ON. Then wait for a long and short beep.

To change to 4800 baud rate, press and hold the Input3 key and turn the power ON. Then wait for a long and short beep.

To change to 9600 baud rate, press and hold the Input4 key and turn the power ON. Then wait for a long and short beep.

SET UNIT SYNC DELAY FUNCTION

Sync delay allows the **MAX** Switcher to delay the switching by a specified time after the commands are issued to switcher. The power up at factory reset default function is for NO SYNC DELAY.

Press and hold Input 5 and turn the power ON. Then wait for long and short beep to set the No sync delay function.

Press and hold Input 6 and turn the power ON. Then wait for long and short beep to set a 5-second sync delay.

Press and hold Input 7 and turn the power ON. Then wait for long and short beep to set a 2-second sync delay.

Other sync delay values can be programmed into the switcher using RS-232 control commands.

IR CONTROL

The **MAX** Switcher can be equipped with an optional **RC5251IR**, Infra-Red Remote Control. To have the **MAX** Switcher recognize the Infra-Red Remote Control Receiver attached to RS-232 port1, please press and hold the IR-Control key (INPUT section key#8) while turning the power ON. The switcher will beep a couple of times and an ON LED next to IR-Control key will verify that the **MAX** Switcher is ready to be controlled by **RC5251IR**. To disable the IR-mode, the switcher has to be reset.

SET UNIT ID NUMBER

When the same control equipment or PC controls more than one **MAX** Switcher, then it is convenient to address each **MAX** Switcher separately by RS-232 commands, by assigning different unit ID numbers.

Press and hold Output 1 and turn the power ON. Then wait for a long and short beep to set the unit ID to 1. If the unit ID is 1 then **MAX** Switcher responds to all commands that are sent.

To set the unit ID to 2, press and hold the OUTPUT2 key while turning the power ON. Wait for a long and short beep, to allow the unit ID to change to 2.

Press and hold Output 3 and turn power ON. Then wait for long and short beep to set the unit ID to 3.

Press and hold Output 4 and turn power ON, then wait for long and short beep to set the unit ID to 4.

RECALL PRE-SET MEMORY

If any connection configuration of inputs to outputs is stored into the switcher's memory, it can be recalled using this option. To switch to RECALL mode, press and hold the RECALL key in switcher/projector control section on the bottom right corner of the front panel. The unit beeps once and all input switch LEDs will flash. Select the memory location to recall from 1 through 8. After the selection, all stored input to output connections will be restored.

SELECT SIGNAL

AUDIO & VIDEO keys allow break away switching of the audio and video signals through the front panel.

By selecting AUDIO and deselecting VIDEO, only the audio portion of the input and output channels will change by subsequent input/output connections. If the AUDIO switch is de-selected and only the VIDEO switch is selected, the audio portion of the signal will not change with subsequent connections.

Normally, both the AUDIO and VIDEO switches are selected and both LED's are ON to provide Audio-follow-Video switching.

STATUS

When the STATUS key is pressed and held, the Front Panel will show system settings of the **MAX** Switcher such as Baud rate, Unit ID, SYNC Delay time, and IR-Control Status.

SOUND

This switch is used to enable/disable audible response (beep), whenever any key is pressed on the Front Panel. The default is SOUND on. To disable Sound (Beep), press and hold the SOUND key for approximately 2 seconds until all LED's flash. The sound function is now disabled. This is a toggle function, so to enable the sound, repeat the same step.

RESET

To reset the switcher to its factory default setting, press [VIDEO] and hold it until all LED's flash.

When the switcher is reset:

- Baud rate is changed to 2400 bps.
- Unit ID is selected to 1.
- IR-Control mode is disabled.
- Sync Delay is set to None.
- All stored memories are cleared.

LOCK / UNLOCK FRONT PANEL

Sometimes it is advantageous to disable the front panel control to ensure that it is not being operated while the remote control is being performed or to avoid accidental changes in system settings/configuration of the switcher by a curious user. Press the [STATUS] key and HOLD until the LED flashes. The front panel is now disabled. To enable front panel, press [STATUS] key and HOLD it until the LED's flash. Now the front panel is enabled.

7.2 RS–232 PROGRAMMING AND CONTROL

The **MAX** Series has many advanced remote control capabilities, which are accessible through standard RS-232 ports through terminal block connectors provided on the back panel. The **MAX** Switcher can be controlled through a computer or control system.

7.2.1 RS-232 PROTOCOL

The Standard RS-232 protocol for the **MAX** Series Matrix Switcher uses simple ASCII character format.

The RS-232 input has a 16-character buffer and will not execute any additional commands until the previous command is fully processed. After processing a valid command an [OK] string will be returned followed by command echo. For example, the [RSET] command will return [OK][RSET]. Version number command, [VERN] will return the firmware version of the switcher, without [OK] such as [1.0]. If a command is not recognized an [ERR] string will be returned.

1. SQUARE BRACKETS ARE PART OF THE COMMAND.
2. USE UPPERCASE LETTERS FOR ALL COMMANDS.
3. PLEASE PUT A 50 ms DELAY BETWEEN TWO CONSECUTIVE COMMANDS.

The RS-232 commands are divided into two groups: Programming & Control.

7.2.2 PROGRAMMING COMMANDS

NOTE: <u>These programming commands are used for setting defaults and configuring the switcher. It should not be used as a part of a program to operate the switcher. The programming setting changes done through these commands are stored in non-volatile memory. Typically these commands can be issued 10,000 times before the memory needs to be replaced.</u>

[SETIDn]

n= Unit ID number 0-9, A-Z, a-z

This command sets a unique ID number to each **MAX** Switcher and allows control of multiple modules through a single RS-232 port. Setting unit ID allows a user to send a command to multiple modules, but the command is processing by module with the indicated ID number only.

The unit ID can be any number or any other ASCII alphanumeric character. A total of 62 unit ID numbers are available. If the unit ID is set to 1 then all switchers will always communicate. From the factory all new units are shipped with unit ID number 1. When the **MAX** is powered "ON" the default unit ID number is 1 regardless of the actual unit ID setting. If the ID level is set to 0, then the unit will not respond to any command other than **[SETIDn]**.

The **[SETIDn]** command is used for programming the switcher; it should not be used as a part of a program to operate the switcher.

[CODEn]

n=1 - Use [ ] as start and end code

n=2 - Use ( ) as start and end code

n=3 - Use {} as start and end code

n=4 - Use :; as start and end code

n=5 - Use <> as start and end code

n=6 - Use : \ as start and end code

Default n=1

Through this command start and end code (command delimiters) for RS-232 control, command strings can be defined. This command can be used for controlling the switcher using different start and end codes. This is an extremely powerful command and can be used to control multiple switchers individually from a single RS-232 control card or PC.

For example, one switcher can be set to have square brackets "[ ]" as the start and end code though the **[CODE1]** command. The other switcher is set to have round brackets "( )" as start and end though the **[CODE2]** command. To control the first switcher the command would be **[I02O03]**, but the same command to control a second switcher would be **(I02O03).**

If codes are used to identify and control individual units, then some general commands which do not include unit ID no. in them can be easily issued. For example, each unit can be reset individually using the following commands: **[RSET]** and **(RSET)**.

[InnOmmS]

nn - Input Number 01 to 08

mm- Output Number 01 to 04

Set the maximum number of inputs and outputs used on the **MAX** Switcher. This command is used at the factory at the time of set up. If the maximum number of inputs is set to 4, then input buttons 5,6,7, and 8 will not work. Once programmed this setting remains in effect even after power is turned on or off. This command is used for programming the switcher. It should not be used as a part of a program to operate the switcher.

[InnOmmA]

nn - Input Number 00 to 96

mm- Output Number 00 to 96

This command defines the offset for inputs and outputs of a **MAX** Switcher. This command is used when the number of inputs or outputs on the switcher needs to be expanded. This command allows continuous numbering of inputs and outputs as the number of inputs and outputs is increased. For example, if a 12 by 8 matrix switcher is made using two **MAX** 8x4 switchers, this command will allow you to arrange inputs end outputs so a command like [I12O04] is recognized. In this case the first switcher will have the offset of inputs and outputs set to zero by the [I00O00A] command and the second switcher will have input offset 8 through the [I08O00A] command.

With this offset command, a matrix switcher can build with a size up to 96x96. This command is used for programming the switcher. It should not be used as a part of a program to operate the switcher.

[IkkOnnL]

nn – loop offset number 00 to 08

kk – any number from 00 to 99

This command is used when looping several switchers together to increase the number of inputs. The input offset will be the same as the number of the last input of the previous unit and it is sent to the switcher through the **[IkkOnnL]** command. After programming looped units, they can be controlled by a single command, **[IxxOyy]** where xx is any number from 01 to 99. Without this loop command capability, units can be controlled with the **[IxxOyy]** command but if several commands are sent there will be a delay between two consecutive commands. To avoid problems, make sure that the following steps are taken:

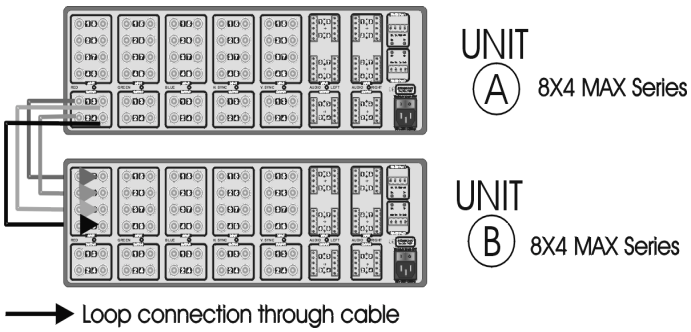
1. The number of outputs must be the same on all units to be looped.
2. Output offset is zero for all units.
3. The input offset must be set for all units except for the first one. The offset for the input should be the same as the last number of the previous unit
4. The number of inputs available on the second unit for a direct connection is the difference between the maximum number of inputs of the second unit, and the number of looped outputs.
5. Set the loop offset separately for each unit. The loop offset is zero for the first unit. For other units the loop offset is the number of outputs of the previous unit.

Example: If the user wants to create a 12x4 switcher, use two 8x4 matrix switchers. Connect output 1 through 4 of the first unit to the last four inputs of a second unit in increasing order. Please program each **MAX** Switcher individually using the following table:

PARAMETER	UNIT A	UNIT B
Size	[I08O04S]	[I08O04S]
Offset	[I00O00A]	[I08O00A]
Loop Command	[I00O00L]	[I00O04L]

Now if you send the commands as follows, the active connectors will be as follows on both units:

COMMAND	UNIT A Connection	UNIT B Connection
[I02O02]	2 - 2	14 - 2
[I09O04]	9 - 4	16 - 4
[16O04]	16 - 4	16 - 4
[17O01]	NONE –1	1 - 1
[128O04]	NONE – 4	12 - 4
[129O03]	NONE - 3	NONE - 3



[SDELnn]

nn - value from 00 to 99, Sync delay time in multiple of 65 ms.

This command sets Sync delay time in 65ms increments. The sync delay can be set to a minimum of none or to a maximum of 6.4 seconds. The sync delay function is useful to avoid an unwanted image (a glitch) that appears on the projector or monitor screen when switching between different sources of different signal resolutions. Typically, a 0.5 seconds delay will clean up the image on most of the displays during the switching. Keep in mind that making the sync delay too long will require the user to wait before implementing the next command until the prior command is executed. When specifying sync delay, capital letters A through F also can be used to get a longer delay. For example, **[SDELFF]** will provide almost 19 seconds of delay.

n=00 corresponds to no Sync delay

n=08 corresponds to 0.5 second delay

n=38 corresponds to 2.5 second delay.

n=99 will set Sync delay of 6.4 second

[VERN] - Version

This command will return the current version of the firmware used on the switcher. It does not require the feedback command to return the feedback. For example if **[VERN]** is typed, the feedback of [3.2] will return from the **MAX** switcher.

[RSET]

This command resets or initializes the switcher to the power-on condition. With this command, the baud rate is changed to 2400 bps, all current inputs from outputs are disconnected, unit ID number is set to 1, memory number 1 is recalled, and all levels (VIDEO & AUDIO) are enabled.

[BAUDn]

n=1(31hex)	300 baud
n=2(32hex)	600 baud
n=3(33hex)	1200 baud
n=4(34hex)	2400 baud
n=5(35hex)	4800 baud
n=6(36hex)	9600 baud

This command switches the **MAX** Switcher into different baud rates. The factory default baud rate setting is for 2400 bps.

The same code for baud rate is used to control projectors from the **MAX** Series Switcher. When controlling other devices, the **MAX** Series has the ability to output RS-232 commands at a specified baud rate yet still be controlled by a fixed baud rate control system.

For example, if you need to control projector using 2400 baud and your control system operates at 9600 baud, you can program the **MAX** Switcher to output commands at 2400 baud rate and receive them at 9600 baud.

[BEEPn]

n=1 Beeper ON

n=0 Beeper OFF

This command allows the beep sound to be turned ON or OFF on the **MAX** Series Switcher, which is generated while pressing a key on the front panel or processing a valid RS-232 command.

7.2.3 CONTROL COMMANDS.

These control commands are used for controlling the switcher: they are a part of a program to operate the switcher. These command actions are lost if power to the unit is lost or if the unit is reset in any way.

[UIDn]

n = unit ID number 0-9, A-Z, a-z

This command is used to enable all switchers, disable all switchers or enable individual switchers with specific unit ID numbers.

n=0 All units with IDs 0-9, A-Z, a-z are disabled and only respond to another **[UIDn]** command. This allows pass-through control of other RS-232 devices on the same RS-232 line without effecting the **MAX**.

n=1 All units with IDs 0-9, A-Z, and a-z are enabled and respond to any of the RS-232 commands. This allows simultaneous control of all **MAX**'s connected to the same RS-232 port.

n=2 through 9, A through Z, a through z
Enables an individual **MAX** Switcher. This command does not disable any units.

For example, if [UID3] is issued followed by [UID2] then both units 3 and 2 will respond to the issued commands. To disable all switchers and enable any particular switcher, issue [UID0] followed by **[UIDn]** of the switcher that needs to be enabled.

[SELn]

n=0 Control all channels together [VIDEO+AUDIO]

n=1 Control Red

n=2 Control Green

n=3 Control Blue

n=4 Control H–Sync and V-Sync

n=5 Control Audio Right

n=6 Control Audio Left

n=7 Control Audio Right and Left (Audio channels)

n=8 Control Red, Green, and Blue

n=9 Control Red, Green, Blue, and H and V Sync (Video channels)

This command allows control of each signal level independently. Once issued it is active until another [SELn] command is issued or the front panel is used to control the switcher.

When the front panel is used, the levels to be controlled are defined by the front panel selections. The front panel allows only 3 options of controlling channels; either AUDIO or VIDEO or AUDIO+VIDEO. It is not recommended to use the RS-232 control and the front panel at the same time to control different channels since front panel will override RS-232 controls.

The LEDs on the back of the unit display the status of a particular level. The RED LED indicates that this level is not enabled for controlling. The GREEN LED indicates that this level is currently enabled for controlling.

During the power ON the **MAX** automatically defaults to n=0 (Control all channels).

[SELnUx]

n = Same as above

This command works the same as above except for specific unit ID number. This command allows selection of levels (channels) on switchers that have been assigned unique unit ID numbers.

[InnOmm]

nn - input number 01 to 08 (if input number 00 is used, that input is disconnected from the selected output)

mm- output number 01 to 04

This command connects Input to Output and switches them immediately.

For example, if you want to connect input 2 to output 1 and switch, the command to be issued will be: [I02O01]. Command [I00O01] will disconnect output 1 from any input.

[InnOmmP]

nn - input number 01 to 08 (if input number 00 is used that input is disconnected from the selected output)

mm- output number 01 to 04

P - path

This command sets the switching path of connecting an input to an output but does not switch.

Through this command input to output connections are loaded (path is set), but not switched until **[SW]** or **[SWUx]** commands or a direct connection command of **[IxxOmm]** is sent.

For example, if you want to connect input 2 to output 1 and not switch it, the command to be issued will be: [I02O01P]

A typical sequence would look like this: [I01O02P][I04O01P][I08O03P][I05O04P][SW] or [I01O02P][I04O01P][I08O03P][I05O04].

[InnOmmUx]

xx Input number 01 to 08

yy Output number 01 to 04

n Unit ID number 0-9, A-Z, a-z

This command allows any input to be connected immediately to any output on a **MAX** Switcher with a specific unit ID.

For example, if two **MAX** Switchers are connected to the same RS-232 port but have unit IDs set as 3 and 4, the following command can be issued to independently control each unit: [I02O04U3][[I04O01U4]. The first command connects input 2 to output 4 on the switcher with ID=3 and the second command connects input 4 to output 1 on the switcher with ID=4.

[InnOmmUxP]

xx Input number 01 to 08

yy Output number 01 to 04

n Unit ID number 0-9, A-Z, a-z

This command is the same as **[InnOmmUx]**, however the switching does not occur until **[SWUx]** or **[SW]** or direct connection command is issued. Through this path command, input to output connections are loaded, but not switched.

This command is used to select multiple inputs and multiple outputs without switching and then switch them together with a single command. This is a very useful command for scene or salvo switching or for controlling through a PC.

If n = 1, units will respond to any command. If n= 0, then none of the units will respond to any issued command, except **[UIDn].**

A typical sequence would look like this: [I01O02U2P][I04O01U2P][I08O03U3P][I05O04U4P]. Set the path for three different switchers with these commands and then switch them all together with the **[SW]** command.

[DOxxyyzzkk]

xx - Input connected to output 1

yy - Input connected to output 2

zz - Input connected to output 3

kk - Input connected to output 4

Connect any 4 inputs to any 4 outputs of the **MAX** Switcher with a single command. This command allows a quick way of connecting inputs and outputs without sending 4 commands with a 50 ms delay between each command. For example, if input 3 needs to be connected to outputs 1,2,3,4, then the following command can be used [DO03030303]. If input 4,5,6,7 need to be connected to outputs 1,2,3,4, then the following command is issued [DO04050607]. The switching of all inputs occurs simultaneously for all outputs. If sync delay is in effect, then it will be used before switching. Input 00 is used to turn a channel 'OFF'. For example, if you want to disconnect all channels use following command [DO00000000]

[DoxxyyzzkkUn]

xx - Input connected to output 1

yy - Input connected to output 2

zz - Input connected to output 3

kk - Input connected to output 4

n - unit ID number 0-9, A-Z, a-z

Connect any 4 inputs to any 4 outputs on a **MAX** Switcher with a specific unit ID number. This command allows quick connection of inputs and outputs of the specific **MAX** Switcher without sending four different commands with 50 ms delays between each command. For example, if input 3 needs to be connected to outputs 1,2,3,4 of the unit with ID=4, then the following command can be used [DO03030303U4]. If inputs 4,5,6,7 need to be connected to outputs 1,2,3,4 on the **MAX** switcher with unit ID number 8, then the following command is issued [DO04050607U8].

The switching of all inputs occurs simultaneously for all outputs. If sync delay is in effect, then it will be used before switching. The unit ID needs to be set for the switcher that needs to be controlled before using this command. Input 00 is used to disconnect output 1 through 4. For example, if you want to disconnect all outputs on the **MAX** Switcher with unit ID number 2, then use the following command [DO00000000U2].

[SW]

Immediately switch the inputs to outputs, which are previously set through path commands.

First set the path using **[InnOmmP]** or **[InnOmmUxP].** Then issue a single **[SW]** command to switch all connections simultaneously, which are loaded by path commands. If Sync delay is enabled the **[SW]** command will delay switching for that period. This command is available only when switchers to be controlled are enabled using **[UID1]**. This command is a very useful for scene or salvo switching or for controlling through a PC.

[SWUx]

x - Unit ID number 0-9, A-Z, and a-z

This command immediately switches inputs to outputs on a specific switcher with a specified unit ID number, which is previously set through a path command.

First the path is set through a **[InnOmmUxP]** command and then a single **[SWUx]** command is issued to switch all connections simultaneously. If Sync delay is enabled, the

[SWUx] command will delay switching for that period.

[FDBKn]

n- 1 enable feedback [OK] or [ERR]

n- 0 disable feedback

This command sets **MAX** Switchers to provide feedback code during RS-232 control operations. Factory default is no feedback.

After [FDBK1] is issued the **MAX** Series Switcher will provide an [OK] if the command is executed properly and [ERR] if the wrong command is issued. If **[FDBK0]** is issued the **MAX** Switcher will not provide any feedback to the control system or program.

Since the **MAX** Series Switcher can control projectors it is recommended that the feedback be set to none. This will guarantee that feedback does not interfere with proper control of projectors.

[SAVn]

n- memory location number 0 to 8

The **MAX** Switcher has 8 memory locations to store a set of connections. Each memory location stores one preset (scene or salvo), which is the current connection between inputs and outputs for active channels of a switcher with a selected unit ID number.

Memory saved in location no.1 is recalled, when the **MAX** Switcher is powered up or RESET. If only [Sel7] saves the memory location for the Audio channel, the then switcher will only recall input to output connections for those audio channels only. If the unit is switched using breakaway audio (video channels only by [SEL9] command), then input to output connections of video channels will be loaded.

[RCLn]

n- memory location number 0 to 8

This command will allow the **MAX** Switcher to recall any of 8 available memories.

Each memory location stores one preset (scene or salvo), which is the current connection between inputs and outputs for active channels of a switcher with a selected unit ID number.

Memory saved in location no.1 is recalled, when the **MAX** Switcher is powered up or RESET. If [Sel7] saves the memory location for the audio channel, then the switcher will only recall input to output connection for those audio channels only. If the unit is switched using breakaway audio (video channels only by [SEL9] command), then the input to output connection of video channels will be loaded.

7.4 PROJECTOR CONTROL

A projector can be controlled through both RS-232 ports or through activity happening on the front panel. Please note that one port is enabled at a time, so if the **MAX** Switcher is used to control the projector, it cannot be connected to and controlled by another RS-232 control source, such as a PC or Control System.

To enable port1 of 1 for projector control, press the Input1 key and then press the Output1 key once to enable RS-232 port 1. An ON green LED next to RS-232 port 1 on the back panel confirms this.

To enable port1 of 2 for projector control, press Input2 key and then press Output2 key once to enable RS-232 port 2. This is conformed by an ON green LED next to RS-232 port 2 on the back panel.

Please note that the receive lines on both ports 1 & 2 are always active regardless of the transmit line. This means that the **MAX** Switcher can receive signals from either port, but it can transmit signals only on one port at a time. Each RS-232 port on the **MAX** Switcher can output commands at a different programmed baud rate.

The output string will be produced, when any input is selected and followed by output. Please contact Altinex for programming instructions to control a projector.

7.5 WINDOWS BASED CONTROL SOFTWARE

This Windows 95/98/NT based Control Software is available from the Altinex website at www.altinex.com in the Download section.

7.6 IR-CONTROL MODE

Wired Infra-red Receiver

Step 1. Make sure that the **MAX** Switcher is in the OFF position.

Step 2. Plug the 4-position terminal plug located at the end of the cable into RS-232 Port 1 located on the top-right corner on the backside of the switcher.
Note: Inserting the 4-positon Terminal connector on RS-232 port 2 will damage the receiver.

Step 3. Please put the receiver within a range of the transmitter and within 30° angle for optimum operation.

MAX Switcher

To enable the IR mode on the **MAX** Switcher, press and hold the IR Control key (INPUT 8) on the Front Panel while turning on the power of the unit. The IR mode is now active. The IR mode remains enabled on the **MAX** Switcher until the unit is reset.

Please note:

1. When IR mode is enabled on the **MAX** Switcher, neither of the two RS-232 ports is available for manual control of the switcher.

2. When IR-Control is enabled for the first time, the first command sent through the key will not work since it is used to initialize the system. However, the **MAX** Switcher will execute all subsequent commands.

3. At certain times, when using commands INPUT 2>OUTPUT 2, the switcher may switch the RS-232 function to port 2 disabling IR control. Pressing INPUT 1>OUTPUT 1 will not enable port 1 for IR control again.

4. To cancel the IR control mode on the **MAX** Switcher, please reset the unit by pressing the RESET key for two seconds. The RESET key is located in the Projector/Switcher Control section of the front panel.

5. Please note that once the IR-mode is canceled, both remote controls through the RS-232 ports are available in addition to the manual control through the front panel. To enable the IR-mode again, follow the procedure mentioned above.

CABLES AND ACCESSORIES 8

Model No.	Description
	RACK MOUNTING BRACKETS
DA1296RM	19"-3U Rack Mount Ears
	TABLE MOUNT BRACKETS
TM1277	3U High, 1 Rack - Wide
	CONTROL OPTIONS
RC5251IR	Infra-Red Hand-held Remote Control Transmitter and Receiver with 6 ft cable
	4 BNC TO 4 BNC COAXIAL CABLE
CB4100MR	Bulk high resolution 4 coax cable (500 ft minimum)
CB4300MR	Bulk super high resolution 4 coax cable (500 ft minimum)
	5 BNC TO 5 BNC COAXIAL CABLE
CB4200MR	Bulk high resolution 5 coax cable (500 ft minimum)
CB4400MR	Bulk super high resolution 5 coax cable (500 ft minimum)
CB5000PL	Bulk high resolution 5 coax cable (500ft minimum) PLENUM-FLEX

All cables listed above are a pre-cut series available in lengths of 6 ft, 12 ft, 25 ft, 50 ft, 75 ft, 100 ft and 150 ft with molded BNC connectors. Please call 1-714-990-2300 for more information.

FAQ (Frequently Asked Questions) 9

No	Question	Answer
1	How do I know which input is connected to which output?	If you press a desired input button, the fast flashing LED on OUTPUT will indicate the present connections of this input to all connected outputs.
2	The **MAX** Switcher does not communicate with a PC or Control System.	When you experience lack of communication, please check the following: 1. The baud rate setting. 2. Cable connection. 3. Unit ID setting.
3	The **MAX** Switcher can not be controlled from the front panel.	Make sure that the front panel is not disabled. Press and hold the STATUS key to activate Control through the front panel. If still it doesn't work then reset the switcher to factory defaults by pressing and holding the "VIDEO" button.
4	Does the **MAX** Series come with rack mounts?	Yes, two rack mount ears should be included with the unit. If you did not receive them, please call us and they will be sent to you.
5	How does one increase the number of inputs or outputs on the switcher?	To increase the number of inputs, one can add a second switcher and loop outputs of the first switcher to the inputs of the second switcher. For example, to create a 12x4 **MAX** Switcher, route 4 outputs of first 8x4 switcher to the input of a second 8x4 switcher. So 8 inputs go into switcher 1 and inputs 9-12 go into switcher 2, while outputs 1-4 are taken from the second switcher. To increase the number of outputs, use a second switcher and an interface with dual outputs. For example, to create an 8x8 **MAX** Switcher, use two 8x4 **MAX** Switchers where inputs to both switchers come from an output distribution amplifier.
6	May I switch audio separate from the video?	Yes, the **MAX** Series has full breakaway capability of Red, Green, Blue, Sync, and Audio through RS-232 control.
7	May I control multiple switchers with one RS-232 card?	Yes, the **MAX** Series is designed to allow the assignment of different ID numbers to individual units. This feature makes it possible to control multiple switchers through the same

		port simultaneously.
8	Can I use contact closure to control the switcher?	Contact closure cannot control the **MAX** Switcher directly, but this can be done using the Altinex **CP7317RS** unit, which is capable of converting contact closure control into RS-232 commands. The number of relays available limits the number of functions available.
9	Is the **MAX** Series capable of controlling various projectors?	Yes, windows based control software is available to allow easy control of the **MAX** Series Switcher and other devices connected to the switcher. Please get it from the Altinex website at www.altinex.com in the Download Section.
10	How can I prevent an end user from tinkering with the controls?	Press and hold the STATUS/FRONT OFF key until it beeps and all LED's on Front Panel are disabled except this key.

TROUBLESHOOTING GUIDE 10

First, make sure that power is connected to the power-input connector and input power is within the range of 90-260 VAC.

Make sure that cables are connected properly and fit snugly. Please immediately replace any defective or damaged cables.

If RS-232 connection is used to control the **MAX** Series Switcher, then please make sure that the connections to each pin of the RS-232 port located on the back of the unit is as described in step 3 of section 6.

In the video module, please make sure that the input level of the video signal RGB is 1.2 V p-p. In the audio module, the input level of the audio signal is 5 V p-p.

If a control system is used to control the switcher through an RS-232 port, make sure that there is at least a 50 ms delay between two adjacent commands being sent. Also make sure that all commands have a square bracket '[' before and "]" after each command if the code is set to 1.

Please verify that a correct ID number is assigned to each unit. If a particular group of modules need to be controlled then the unit ID number must be the same for all the modules in that group. The unit ID number 0 will make the **MAX** unit not respond to any command, while unit ID number 1 in the command will have all units follow the command.

When any Input or Output LED is flashing, please do not use the SAVE, RECALL, or RESET function.

To use the SAVE function, first connect the desired INPUTS to OUTPUTS and then press any memory button from 1 through 8 and keep it pressed until all lights blink and confirmation is given through an audible beep.

To use the RECALL function, make sure no INPUT or OUTPUT LED is flashing and then press the RECALL button until all lights on memory 1 through 8 blink. Then press the desired memory location to recall from 1 through 8.

To verify the connection, press any OUTPUT LED, which will show all inputs, attached to that particular OUTPUT by flashing INPUT LED's. To verify the connection of any particular output, please press the desired output. All attached inputs to that output will have an LED flashing.

If you are using RS-232 control for this unit, please follow the connection instructions as described in the manual and verify the operation with downloaded software for PC's from the DOWNLOAD section of the Altinex website: www.altinex.com.

ALTINEX POLICY 11

11.1 LIMITED WARRANTY

Altinex warrants that its **MAX** Series Matrix Switchers are free from defects in materials under normal use and service. This warranty is limited to repairing at company's factory any part or parts of the product, which upon company's examination shall disclose to be, thus defective. Products considered defective should be returned to company with transportation charges pre-paid within 2 years (90 days for cables) from date of shipment to the purchaser. The warranty is expressly instead of all other warranties expressed or implied. Altinex neither assumes nor authorizes any other person to assume for it any other liability concerning the sale of the products. This warranty shall not apply to any product that shall have been repaired or altered outside of company's factory in any way so as, in its judgment, to affect its stability or reliability, or that has been subject to misuse, negligence or accident.

11.2 RETURN POLICY

It is very important to Altinex that you receive the products that you have ordered and that this product fulfills your need. In the unlikely event, that an Altinex product needs to be returned please follow the policies below:

Altinex will accept product returns for a period of 30 days from authorized Altinex dealers. Products must be returned in an unopened package.

If a product has been opened, the restocking fees will apply. For the restocking fee amount, please contact an Altinex Sales Representative.

If the product is in your possession for more than 30 days, the restocking fees will apply.

Altinex will not accept any returns on cables or custom products.

If your product is in warranty and needs service, contact the Altinex Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service.

If your product is out of warranty and needs service, contact the Altinex Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service. The service charges will be quoted to you before the actual repairs are done.

11.3 CONTACT INFORMATION

Sales Department

Phone:	714-990-2300
Fax:	714-990-3303

Accounting Department

Phone:	714-990-6088
Fax:	714-990-5778